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An

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on the

Mechanism & Physiology

of the

Human Head

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by

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of

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Felix qui potuit rerum cognoscere causas. Virg:

Introduction

The attention which has been bestowed upon the human head by anatomists and physiologists of every age – the precision with which the various peculiarities of its structure have been examined and described, afford, it is conceived, sufficient evidence of its importance; and even if this were absent, a short reflection upon the nature of its connections with the system at large, and the part which it acts in the general economy, would amply suffice to supply its place. Assigned as the seat of the most important of those faculties, by which Man sustains his relation with surrounding objects, and, it may be added, his supremacy over all other terrestrial beings; it presents to the eye of the physical enquirer, some of the most interesting and skilful arrangements, to be met with, perhaps, in any part of the human system. To elucidate these is the design of the present essay. The author regrets that he brings to the undertaking, so inadequate a share of

ability and observation; but, he is not without a hope, that the errors, which inevitably attend the paths of inexperience, even in the simplest pursuits, will re=ceive from those, to whom he has the honour to sub=mit the result of his enquiries, a kind and liberal in=dulgence.

I. 1. The first circumstance, connected with the human head, which seems entitled to attention, is its elevated position. This is the peculiar characteristic of the dignity of Man, and of his superior rank in the scale of creation. In the beautiful language of the Poet,

Dum

Os homini sublime dedit: coelumque tueri;
Jussit et erectos, ad sidera, tollere vultus.

It would seem, indeed, on a casual observation, as if the remainder of the frame were only designed to afford to this particular part of it, a firm support and to maintain it secure in its commanding pre-eminence.

Nature, though simple in her operations, is ever pro=
=found; and one of her chief merits consists in deriving,
from single causes, a variety of useful & interesting effects.
Of the truth of this remark, this apparently trivial cir=
=cumstance of the head, furnishes a sufficient illustra
=tion. While by this means, Man impresses upon other
animals, a sense of his superiority; his intellect is
enlarged, by a wider scope of observation, and his
senses removed beyond the influence of those gross,
corporeal objects, to which the latter, by the very cir=
=cumstance of a peculiar form, seem naturally
allied;

Quæ natura prona atque ventri obedientia
finxit. Sall:

He looks abroad; he contemplates the extended beau
ty of the earth and skies; and selects objects worthy
of peculiar admiration, by the opportunity of com
=parison, which an enlarged vision affords. That the
elevation of the head is the peculiar attribute of a su

perfect and intellectual being, is indicated by the fact, that it is not the sequential attributes even of the human race, but the acquirement of age, at an early period of life, when his wants are the only stimulus to exertion. When a noble cry or an impetuous struggle is the only means, by which they are communicated to others — when instinct has not yet yielded to the voice of reason. In the inferior animals, the wild roaming over the earth, consumes the greater portion of his time in idle and inactivity, and hence, in almost every respect, the superiority of the quadruped. But existence advances, the dawn of intellect accompanies an inclination to stand erect; his dearest surrounding objects attract his attention; the sportive tendency declines; instinct resigns her arbitrary control, and intellect becomes gradually developed, by an attachment to particular pursuits, and a general and lively curiosity. The figure soon becomes steady and upright; the head is elevated, and the senses

thus receive the most suitable training for the fulfil-
ment of their peculiar duties. By an arrangement, to
which we have alluded, that man is by nature,
[illegible] in a position, to which we are
[illegible] a civilized state, to manifest
habit [illegible]. But notwithstanding of many other con-
siderations to the same effect, [illegible]
[illegible] connected with the [illegible] of [illegible]
[illegible] establish the entire [illegible] of the [illegible]
[illegible] In contemplating the head of the [illegible],
[illegible] circumstances [illegible] [illegible]
[illegible] some. Secondly, the [illegible]
[illegible] cavity [illegible]
[illegible], this is obviously [illegible]
[illegible] the [illegible] of [illegible]
[illegible] that behind it, which [illegible], it is
[illegible] that [illegible] provided [illegible]
[illegible] which would [illegible] [illegible]
[illegible] more advanced situation [illegible] the [illegible]

[illegible]

[illegible] the position of the road must be invariably inconvenient, and the movement [illegible] [illegible] by the [illegible] [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

of the [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] with the [illegible] [illegible] [illegible] hesitation [illegible] [illegible] [illegible] which [illegible] given to us."

1.2 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible]

[illegible] The [illegible]

[illegible] interesting [illegible]

[illegible] case detailed by Dr. Rush in his interesting

work on the diseases of the mind, [illegible], I think will

[illegible] considerable [illegible] between the in-

[illegible] the mental operations, and the [illegible] attended;

[illegible] to prove, that the other [illegible] per-

[illegible] incurrent with the maintainment of the

[illegible] the disease was all malignant [illegible]

[illegible] of the head, a general listlessness [illegible],

together with a [illegible] obliquity of mind [illegible]

-tinued, the mind becomes still more enfeebled, and the patient at length becomes [illegible] [illegible], [illegible] hands and feet. At length, the intellect [illegible] is observed to have ceased altogether. The patient has entirely lost the power of locomotion, lies prostrate on the ground, like a mass of inanimate matter, and according to the history of the case, would roll from the top to the bottom of a flight of stairs, without an effort to save himself. Though this would be the case, if the functions of the mind were altogether [illegible], [illegible] there [illegible] attended with a complete suspension of the mental functions; but such does not appear to be the fact, in the earlier forms of this evil; the latter are not lost but deranged; their just & worthy balance is destroyed: the outcomes of thought are rapid and irregular, and the motions of the body, in like manner, sudden and turbulent. In these cases commonly the head is always thrown back. "It is well known," says Thomas, "that patients of this order are

[illegible]

1.3. [illegible]

protection from external injuries is designed [illegible] ultimately benefited, [illegible] the [illegible] than any other endowments of the system, [illegible] many of the minor [illegible], [illegible], we are enabled to [illegible] and [illegible] [illegible] [illegible], to [illegible] the [illegible] of the [illegible] tion, and even to [illegible] the [illegible]. [illegible] excited [illegible] [illegible] of [illegible], on the superior [illegible] exhibited and [illegible] of the [illegible], are innumerable; and the wisdom which [illegible] ingeniously [illegible], [illegible] [illegible], and [illegible] [illegible]. From what, then, arises this [illegible] to [illegible] [illegible] of consideration of the [illegible] this sensibility, [illegible] they inform us, this is, to [illegible] of the [illegible] [illegible] objects [illegible] these [illegible] [illegible] [illegible] of the [illegible] circumstance [illegible] [illegible] placed [illegible] necessary [illegible] [illegible] with a sensibility to their [illegible],

in various degrees. This sense was, consequently, confined to the skin, or dermoid tissue, and resides, to a degree of extreme delicacy, in the ends of the fingers, which are especially intended to examine the condition of the surface, the bulk, shape and consistence of things. It may be, consequently, injured or even annihilated, in one part and the case [illegible] being, and yet [illegible] unimpaired in others. But such is not the case with any of the other senses. [illegible] specifically [illegible] may be to the subversion of their destined offices. If, for example, a part of the eye have sustained an injury as in [illegible] in which [illegible] the vessels of the outer membrane of the eye, the *adnata* are enlarged, [illegible] opacity of the cornea, is induced, sight is immediately obstructed or totally destroyed. The obstruction of the [illegible] of the ear, in the [illegible] bones, or [illegible] Eustachian tube is stopped up, partial or total deafness is the necessary result, and if the tongue [illegible] the

principal organ of sense be affected with disease, this disease must be highly injurious. While the advantage is thus provided, which the lowest, as to our half houses over all the other senses, as well the adaptation of the arrangement of the principle of vision to the rather peculiar degree of light, as well as more the impression exercised, legend extension, it is hence, indeed, equally manifest, that the sight, which has been regarded by the moral, as well as by the medical philosophers, "the most perfect and the most delightful of all our senses" rises superior to all the rest, and constitutes the best, for the security it bestows, by giving the earliest intimation of approaching danger.

L.4. The position of the head is productive of no small advantage to the brain in the particular, that it gives to the veins of the neck an utility of blood, so much so that important evidence of great importance, that it has been found in cases of apoplexy, bleeding

to the bone chamois, when the vessels are prepared: a preparation and examination and contribution to prove to its descent. There appears particularly obvious in the groove on the internal surface of the mastoid bone of the temporal bone, and in the junction between the lateral and longitudinal sinuses, on the angle of the occipital cross, constituting the torcular Herophili. All the sinuses of the dura mater seem to be devoted to a similar office, an office which I have long with perfect safety to the brain, by being situated at its base, between the lamina of that membrane. The connection which this circumstance, between the position of the head and the passage of the blood distributed to the brain, has at different stages of existence, a material influence on the development of the latter. This being assigned to a very early period, it is easy to perceive the propriety of giving to the head, in the foetal state, a position, instead of an erected position. By this means the current of the circulation is rapidly determined towards

it. While the stature is retarded, and, nevertheless, the constitution would seem to be in a good state, in ren-
dering the inclined posture, the best, or rather, the
to the mind, alone practicable, this posture, therefore,
as the relative disorder, is most unhappy,
a misfortune, in some cases, so far extended, as to
create a hatred to it, arising from disease, and to occa-
sion serious mistakes, in the corporeal management
of children, thus opposed to it.

15. In many diseases, the position of the head is a cir-
cumstance not to be entirely overlooked or disregarded by the
physician. If, at the commencement, when the brain
is liable to be affected, in phrenitis, and other diseases
of the same kind, depending on inflammation; it is
I think, almost superfluous to mention the great advan-
tage of placing the head erect. The same remark may
be made with respect to apoplexy, cerebral congestion,
hydrocephalus, concussion and compression
of the brain, and all cases of coma in that organ

to great influence of the atmospheric circumstances, [illegible]

[illegible] of the mind, [illegible] [illegible]

[illegible] attitude; [illegible] [illegible]

[illegible] of the mind, [illegible] of the mental, "stare fixed & bound" [illegible] While engaged

in the performance of this catalogue, [illegible]

a partial equilibrium of the human stature, [illegible]

contemplate, without apprehension, the great engorge-

ment of the head - engorgement indicated, but less

clearly, in the darkened fusion of the face, the swelling

of the lips and eyelids, the contortion of the features,

and the rolling of the eyes! In persons subject to dys-

pepsia, a slight stooping or inclination of the head,

is often sufficient to produce a return of the pecu-

liar sensations of fulness, dizziness and blindness, which,

so frequently, accompany this unpleasant disorder. By

this, consequently, the propriety is indicated, of such ex-

[illegible] the [illegible] patient [illegible] to [illegible] a considerable elevation from a [illegible] position, [illegible] the [illegible] plan recommended, sometimes become [illegible], as to render the measure of bringing the [illegible] not only disagreeable, but really painful; and, after its accomplishment, to produce a sickness, giddiness, that [illegible] vomiting, and a feeling of manifest distress in consequence of sudden variations in the determination of blood to the respective brain. [illegible] of its natural [illegible], an important part of the treatment consists, in having the patient in the horizontal position, by which the return of the circulation may be insured to the head. In many instances, this single method is alone sufficient to restore the patient; a fact, of which a striking illustration is mentioned by Dr. Pierick, in his book [illegible] quite [illegible] of [illegible] the [illegible] consideration, accounts for the [illegible] attempts to stand [illegible]

were to sit upright, and remained, unpassing back to the recumbent position. With a very great number of persons, a proper disposition of their minds, this has been sufficient. For since, in the language of Thomas Willis, "diseases of them are based on darkness, since to an accumulation of blood in the minute distributing systems the great morbid change which takes place in accidents of this nature," and since, in the words of the same author, "the external surface of the brain appears of a highly florid colour;" and as a relation of the head is absolutely indispensable, it is in the removal of this cause and state of things so much in this, that the effect produces, which is frequently learned by the image, by placing the head, and even, in some cases, inclining the patient, with it resting towards, with a view of emptying the lungs and stomach of the water to which the, usually the suspension of such air, has a great merit. But if should by removing the unfortunate sufferer from these tortures of ignorance, be extinguished, the

=ly remaining sparks of life. The same remark is appli=cable to cases of [illegible], [illegible] and suffocation, in both of which however, as there is always a greater turges=cence of the vessels of the brain, make [illegible] is rendered more necessary.

II.1. [illegible] must be general. [illegible] [illegible] [illegible] ry than are [illegible] of the disease, yet, whenever it does become subject to them, which, it is evident, must [illegible], its oval conformation, [illegible] all in its superior part, is obviously unfavourable to its defence. [illegible] circumstance [illegible] [illegible] [illegible] and the [illegible] of directing offending agents from the [illegible], [illegible] is most advantageously exhibited in the case of [illegible], and in the [illegible] of [illegible], in that of [illegible] from [illegible] and [illegible]

[illegible] of the [illegible], [illegible] [illegible]ality, that they would be [illegible] [illegible] sustain, for a length of time, a burden which might bring [illegible] bear upon an arch of the cranium without producing in it, the slightest rupture or alteration of shape. This idea is accordingly an experimental illustration, and [illegible] renders to effect, that if the cranium were to be tried, on the head detached of its integuments, the weight which may be accumulated on the skull, will exceed all anticipation. The advantage of the arched or [illegible] form of the skull, [illegible] the resistance it necessarily sustains from [illegible] [illegible] [illegible], against hard blows, or [illegible], would [illegible] be augmented [illegible] the individual. From this immense importance of [illegible] both cranium, nature seems to have exercised all her skill, in providing against the ill effects which might otherwise result, from an inconsiderable change, occasioned by particular modes of life. Thus, in the [illegible]

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible],
to [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] and [illegible] [illegible] almost [illegible] [illegible] [illegible]
tongue, are usually [illegible] [illegible] [illegible] [illegible]
in increase [illegible] [illegible] and [illegible]. [illegible]
[illegible] [illegible] [illegible] manifested in the [illegible] [illegible],
whose ability of [illegible] [illegible] [illegible] [illegible]
is peculiar to all who [illegible] [illegible], [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible]
to [illegible] [illegible] [illegible] for the first [illegible] [illegible].
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
that [illegible] the [illegible] [illegible] and [illegible],
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] which
[illegible] and [illegible] [illegible] [illegible] [illegible] [illegible]
and [illegible]. With regards to the second [illegible] viz
the [illegible] [illegible] [illegible] of the [illegible], for
by [illegible] offending agents from the [illegible], this
well illustrated, in the severe blows which are often
inflicted on it; in sabre cuts, in which large portions

of the walls are too soft, and which, if the head were flat, must inevitably have already sunk, and, as certainly, in the course which is required of the latter by mask & bath, bent down the dome and chin, without an accident, into the stomach. This remark has an important surgical relation; and, the accidents of this kind, should caution the surgeon, neither to shock nor act from the present appearances.

II. 2. But the general figure of the head is modified by some remarkable irregularities. These are the angular projections of the superciliary ridges, the mastoid & zygomatic processes of the temporal bones, and the round protuberances of the occiput, not to mention at present, the numerous and remarkable prominences of the face. And first of the superciliary ridges. In examining this part of the head, it will be found, that the internal and external tables of the cranium do not correspond, or unite with each other, but on the contrary diverge, so as to form a cavity over each of the superciliaries, the dimen

sessions of which may be described, as having some resemblance, to what, both at their base, and from the fault in an inch in breadth, no different kind, this goods... additional instance of the skill and economy, with which, from the incessant activity of the eye, combined with the extreme delicacy of its organization, it became necessary, that such an arrangement should be adopted for its defence, we find this last production of many other important uses. The superciliary ridges first, form over the eye a strong and solid arch, and multiplied in proportion to the strength, in which that organ is enclosed. 2nd: It is from the superciliary ridges, that the eyebrows receive that elevation, by which they are enabled to absorb the superabundant rays of light — an office which physiologists have usually assigned to them. 3rd: They afford a firm base of support, on the front of the cranium; & lastly, by their solidity and firmness, contribute materially, to the protection of the encephalon. This last mentioned advantage is still farther promoted, by

the extension cavities situated behind the temples, which it may be mentioned, that an area, nearly similar, exists in the occipital portion, and to the point, in certain, the most exposed part of the head, and consequently a part of the cranium, which, according to the testimonies of surgeons, and others, is by far the most necessary to the life of the individual. For illustration of the hospital influence thus assigned to the frontal sinuses, I will take occasion to submit a brief notice of a case which, some time since, I was afforded an opportunity of witnessing in person. He had been attacked by robbers, received on his head three severe blows, subsequently ascertained to have been inflicted by a blacksmith's sledge hammer; the wounds were attended with compound fracture of the bone, two of them was situated in the upper part of the os frontis; a second behind this and lower down, on the parietal bone; the third began in a transverse direction, over the left eye, being about an inch and a half in length, and about half

an inch in breadth. From the existing symptoms, and an examination of the head, about an hour after the occurrence of the wound, that is the longest wound the lower was considerably depressed and required the employment of the trephine on its removal; after which, the patient became rational, and the symptoms of compression disappeared, from coincidence by the upper surface, not be interfere with the third wound. A proceeding really justified by subsequent circumstances, presently to be mentioned. Thus necessary for my purpose, to detail minutely the progress of the case, it will suffice, to state, that in the course of treatment, it was found necessary to remove the dura mater, in one of the wounds, in order to evacuate the pus which had collected beneath it; and that hernia cerebri having followed this operation, the patient expired, about the nineteenth day after original injury was sustained. The head was examined after death, and attention directed, particularly, to the third wound which had not been operated on. The external table of the bone was pen

fractures of the cranium already mentioned, it is internal to the cerebrum, or has excited inflammation; when the depression was little more than perceptible. There was no inflammation, and bony union was regularly proceeding, little permanent injury, if any, therefore, would have followed this injury. There, therefore, I conceive the advantages have arisen to the surgeon, to be clearly ascertained. The resistance in the external table of the cranium is the thickest, and almost equally extensive with that of the whole bone, being attended with very little injury to the inner table. What I have said respecting the superciliary ridges, is equally applicable to the occipital protuberance, it is both thick, and it is manifest that the entire bone is admirably adapted, by the same principle, for protecting the important parts which it encloses. There is another way in which this protuberance is attended with great effects. Falls, in the human species, are either forwards or backwards. In the former case, the hands are involuntarily extended to prevent the forehead from striking the ground; while,

in the latter, the same means of defence not being required; its deficiency is supplied by the great density and thickness of this protuberance. The zygomatic processes of the temporal bones, besides forming a safe enclosure for the temporal muscles, and affording a insertion to the corresponding fascia; together with this fascia, which would seem, from its remarkable strength and thickness, to be intended to supply the place of bone, complete the general protection of the head, and contribute to its solidity, by uniting the malar and temporal bones, along with each other. The mastoid processes, exteriorly considered, afford a strong and favourable insertion to the sterno cleido mastoid muscle — an agent of the highest importance, in the various motions of the head. Internally, their structure is cellular; and it has been suggested by physiologists that "their weight, extent of which increases with age, are perhaps necessary in order to make up, by augmenting the power of the vibration, for the stiffness of the membrane forming the tympanum, for the diminished sensibility of the acoustic nerve."

II. 3. A very many distinguished naturalists have of late established a prominent mark of distinction between the various classes of the human race, founded on the general correctness of their moral and intellectual characteristics. Even in ordinary intercourse, a similar observation is far from being uncommon. The head is the seat of the brain and consequently of the mind. Enquiries extended through the various gradations of animated nature, seem to have led to the conclusion, that a peculiar form of the head, designates the approach of animals to an intellectual character, and an aptitude for education. It is known, that animals, so very different in other respects, exhibit a direct contrasting temper and disposition. The wolf is fierce and untameable, while the dog is gentle, docile and susceptible of instruction, to an astonishing degree; nay, even excelling man, in many of those attributes which do honour to the human race — in the ardour and disinterestedness of his friendship, the unalienable firmness of his attachment, the cautious

introducing of his courage, and the perseverance, fidelity, & intelligence, he shows a very different character from the dog, & from all the brute species, & more of the part in which the zoologists will consider the difference of formation, total, it is true, more different tribes of animals; but supposing different individuals in the same tribe. This remark is well illustrated in the different species of dogs, which are each marked by its peculiar traits. The stone hound, greyhound, mastiff, terrier, cur, &c. differ widely from each other, while the head constitutes (if we except varieties in size) which cannot be compared into the account the only marked physical dissimilitude. These facts, I conceive therefore justify a conclusion, that the same means of distinction are to be considered to our non-excluded species; and this conclusion is still farther corroborated by daily observation & general experience. We rarely find a dwarf mistaken shape, with a narrow, depressed forehead, and small angular face,

allied with a prominent [illegible] [illegible] [illegible], [illegible] [illegible]; while the high arched brow, and prominent forehead and wide vaulted cranium, and the more ascending growth, in a more vertical direction, impresses us, on the first view, with a sense of the mental superiority of their possessor. On this interesting subject, the celebrated Camper has come to the following conclusion. If a line be drawn longitudinally, from the forehead to the mouth, and another transversely, from the point of the ear, to meet the other line; the head will be perfectly formed, in proportion as these two lines approach to a right angle. The skull of the Grecian makes nearly a right angle; that of the European of colder climates is something less; the savage and the Hottentot have their gradual approaches to an acute angle, in consequence of the greater or less protrusion of the bones of the face. The ape, the dog and the swine make a still more acute angle; till, at length, in the beaks of birds, the two lines nearly meet. This junction of the lines, above referred to, constitutes what has been denominated the facial angle; and the application of it which

has been thus made to the different engravings in the entire work by historical research. The distinguishing mark of the Mulattoes, which has required a more extended term, may be stated as consisting in the "of the human species" [illegible] "there are three which are constantly visible in appearance. They are the white or Caucasian, the black or African, the Mulatto. The Caucasian race to which we belong is distinguished by the [illegible] form of the head and face, which approaches nearest to the ideal standard of the human species. It has some difference in the shade of the complexion and in the colour of the hair. The African is known by its prominent cranium, nut face, narrow and oblique eyes, straight and black hair, thick lips and olive complexion. The Mulatto is known by his [illegible] stature and [illegible] and [illegible] in this side of the [illegible] that it is privileged in [illegible] stationary. The engraver is confined to the

South of Africa. Its complexion is black, its hair wool
like; its skull compressed more peculiarly in a similar manner
and its lips make it manifest throughout the Negro
tribe: the people which composed this conspiracy always
remained in a state of barbarism." could it not be
that we have here found the special angle of man, the point
at which gathering obscurity upon it we have occasion
to introduce some other system of phrenology,
consequently, in accordance with the peculiar
[illegible] or rule to add to that already established.
"It invariable relation is manifested between the size of
the special angle, the capacious case of the cranium & the
dig. of the head and vivacity of the mind. The more the face
approaches to a right angle, the larger is the cavity of the
nose and of the mouth, and the greater is that of the cranium,
thereby manifesting a more voluminous and intellectual
brain. On the contrary, the more acute the facial angle is,
the smaller is the volume of the brain, and the cavity of
nose and mouth. This is so frequently the case, that Di

and I consider it as a fair and legitimate inference from the development of the organs of that mind, in an increase relative size of the brain, and consequently of the degree of intellectual power. But what does it shew? Is there any relation between the intellectual attributes or extension or exact determination of the degree of each, or combination and indication of their aggregate superiority or inferiority? Shall we recede the issue with Gall, Spurzheim & their disciples, or recede with their more sceptical opponents, in maintaining the reverse? To enter particularly into the discussion of this question, is certainly foreign to the design of the present essay; but it is proper to remark, that whatever conclusions pass on the subject, the pursuits and investigations which it solicits, are closely connected with anatomical & physiological advancement. The researches of Gall & Spurzheim, by common consent, contribute more to explain the structure and formation of the brain, than those of any other anatomists; & as many of the most important physiological truths have followed their discoveries, which, might

otherwise, have yet remained unknown; their exertions deserve, if not imitation, at least respect; and their beautiful theory, if not the wished weal, at least the investigation of the scientific.

II. 4. If the attractive character and the informal of the head, he then usually round, elongated, or pyramidal; former alone and modified, the proportion of the characters effected in the latter, by mechanical agency. Some, may perhaps, range brier, particularly the Indian, of the, & some of those who inhabit the continent of America as the Pentanos and some of the North American Indians; alteration of the head are not uncommon; the hair sometimes flattened on one side behind, sometimes on the sides; sometimes into a semicircle, & in other instances, a quadrangular form; yet they do not appear to differ essentially in their general characteristics, but alike solicit the same unsettled and uncivilized mode of life. They are found to be addicted to similar occupations, as of war, hunting & fishing — are alike cruel or humane;

[illegible] dispersion [illegible] the attempts which have been made, to trace resemblance among the [illegible] of civilized nations. But [illegible] to the doctrine, I have [illegible] since the same peculiarities are found to exist among the [illegible] animals, though of different races, and different physical conformation. The [illegible] the bear the tiger and the hyena, [illegible] perceptibly [illegible] the researches of naturalists [illegible] [illegible] resemblance being [illegible] distinct [illegible] unattainable by the interference of art, and [illegible] in the succeeding race of man from the earliest period of their existence. It has consequently happened, that [illegible] children of the forest, have been taken by the [illegible] science and cultivation, [illegible] enquiries of civilized man; the [illegible] and [illegible] attribute of the race, has [illegible]

abandoned the habits of civilization and civilized life, in
order to return to the wilds of their native wilderness
have entered with an increased ardour, into the
scenes, from which education had warped, or strongly
to deter them. But so far as intellect is concerned,
sufficient has, I conceive, been said, to establish the po
sition I have adopted. It has been shown, that the
heads of the Indian and Negro race,
not differing widely, from the other, in their intellec
tual attributes, are very different in conformation;
and extending this fact, to the mechanical relations
to which the form is subjected, in the two
race tribes, above mentioned, I think it reasonable
to infer in general, not altogether to have
had various shades of difference, in weakness or
imbecility of the mental faculties. How far is this obvi
ous deduction by the fact, that mal-conformation of the
head is frequently a cause of imbecility, accordingly we
have. Dr. Gall while he admits, that such cases may

affected in the human head, we have not, strictly speaking, to attribute them to bulbs, but rather to a peculiar bulb, this may be regarded, as affording an explanation of the transiency and unchangeableness of an imal instincts, and arises from the circumstance, that in these animals, the brain being principally designed for instinct and sensation, which are indispensable to the preservation, Nature has so closely connected its integrity with their existence, as to render it impossible to alter the one, without the destruction of the other. The same remark may be applied to that part, the human brain, which possesses similarity of functions according to the most eminent modern Physiologists, this is the medulla oblongata and the pons varolii. "The last, in the language of Bossais "as the most essential, is also the best protected and most hidden of the whole encephalic mass." It is consequently impossible, to effect in them any change, without the entire destruction of the individual; the part of the head corresponding to the sen=

[illegible] the intellectual functions may be variously altered, not [illegible] either in its nature, and hence, I conclude, that in the [illegible] the mind is modified by mechanical changes in the conformation of the head; yet its distinct may remain entirely unchanged, and possess an identity of character in all animals of the same species.

III 1. If we [illegible] the attention to the fact, the first circumstance we remark is the inequality of the surface that presents to view the vertices of numerous angular projections which contribute to the security of the brain, by affording to its processes points of attachment and connection. This opinion seems to be corroborated by a consideration of the [illegible] which [illegible] in different parts of the vertex of the head, or its base, which sustain the entire weight of the brain, [illegible] are solid and immoveable, consisting of hard and compact bone; while in the superior and lateral parts, where separation only seems necessary, the [illegible] by a membrane

at once smooth, secure and pliable — all — in to the sides to which they belong, sufficient motion and effectually prevent either adhesion or undue pressure. In examining these prominences individually, it will be seen, that while they give security to the brain, many of them perform an additional office, not less useful, in relation to the nerves and blood vessels, which emanate from, or are directed towards it. I conceive for example, the crista galli of the ethmoid bone, will adapted to protect the minute ramifications of the olfactory nerves, in their descent through the foramina of the cribriform plate; for, as I have stated, it to be remembered, there appears to be nothing to prevent the anterior part of the cerebrum, from occupying the cavity around its base. It seems, therefore, to act like the prolongation of the dura mater and therefore the brain is a sufficient and seemingly designed barrier to exist in the projection of the upper part of the foramen opticum, in regard to the second pair of nerves; in the foramen lacerum anterior to the third, fourth, sixth and first branch of the fifth

plex; in the anterior and posterior cerebral processes, to the ob=
=lique processes, where the cerebellum and the vertebrae; in the lat=
=eral ones, from the sides of the medulla oblongata, in the mater=
=ditorius internus, and, finally, in the cranium particular,
through which is transmitted the chief blood-vessel of the
brain. With regard to this last, its peculiar and abnormal
curvature has been universally remarked, as intended to
diminish the impetus of the large current of blood, of which
it forms the channel.

III. The arrangements of the vertebrae, in the
neck, the cervical and extensors part of the trunk, are
also more or less peculiar. In a former part of this essay, it was
observed, that in human beings other parts of the head,
and of the body might be subjected to, through
mechanical influence, this still more or less, in a
material degree. It was attempted to exhibit the ad=
=vantages arising from this peculiarity, by stating the im=
=portance of the enclosed parts, to the preservation of the in=
=dividual; and, perhaps, that the proportion of density, as

firmness, on which this peculiarity depends, will be suffici-
ent to resist extreme, by a sensible alteration of its growth and direct
ground. Considering the writings of naturalists, we find that
in carries the third month of the foetal existence, the fora-
men of ossification has commenced advanced in all the bones
of the head: that it is more extensive about its base, and
terminated in at its back and lateral parts. At birth, the
base is entirely ossified, with a few minor exceptions; & seems
to be but slightly acted on, even by disease affecting its o-
ther parts; a fact which is obvious in hydrocephalus. Its
possession of the properties above mentioned, is the consequence
of this advance of ossification, and enables it to resist any en-
croachment, whether of injury from without, or of the verte-
bral column beneath. It is this the only bone of which
as much can be said. It will be found, on examination, that the
bones which form the base of the cranium, are chiefly
hollow and destined to the performance of important
duties. The ethmoid and sphenoid bones are occupied by
cellulous cavity, which physiologists have named aer

=bibitis of the bones in the various species, being a
[illegible] for the impression of the digestive
[illegible] and the petrifactions of the tempered bones, the
not known deposited of all that complicated & minute
structure which constitutes the essence of tooth, such being
the case, the advantage resulting from the hardness and
solidity of the bones must be at once indicated. This
last is, indeed, the hardest and most compact bone to be
found in the skeleton; and approaches more nearly than
any other, in its composition, to the enamel of the teeth.

With these observations, I shall close my inquiries, at least as, into this highly interesting subject. It will be perceived, that many points connected with it, have been entirely omitted, and others, only briefly noticed, which have, individually, elicited protracted discussions. This step, will not, I think, be considered improper, when the motives which impelled me to it are understood. To repeat what has been already so frequently detailed, once is now generally known, I conceived would have

increasing words unnecessarily; and I have been diffi=
=dent in promulgating theories, peculiar to myself, from
having recollected, how few of the opinions of youth a=
=bide the test of experience, or recieve the sanction of more
deliberate reflection.

In thus parting with those, under whom my Medi=
=cal studies have been principally pursued; I cannot
forego the opportunity, of tendering to them, the tribute
of my unfeigned respect. To the period which has been
spent under their direction, I shall ever revert with plea=
=sure and satisfaction; and I shall regard their valuable
instructions, not only as enlarging the sphere of my liberal
information; but as enabling me to aid, more effectu
ally, in the promotion of those great designs, for which
we have been all intended by a wise and beneficent
Creator, the relief of human suffering, and the advancement
of human happiness.

The End.

4

Dr Gibson

47 52 8th

Passed March 3d 1828